

REMARKS

The Office action mailed 9 July 2007, has been received and its contents carefully noted. The pending claims, claims 1-7, were rejected. Reconsideration and entry of the claims as amended are respectfully requested.

Clarification - Pending Claims

Applicants respectfully submit that the Examiner either overlooked claims 17-26 or that instances of "16" with respect to the claims in the Office action are typographical errors which should be --26--. In order to clarify the Office action, on about 19 July 2007, the undersigned attempted to contact the Examiner and left a voicemail message. On 8 October 2007, the undersigned again attempted to contact the Examiner twice, but it appears that the telephone number has been disconnected as no connection was obtained.

Applicants assume that "16" is a typographical error which is meant to be --26--, such that claims 12-26 are objected to, but would be found allowable if rewritten in independent form. Should this not be the case, Applicants respectfully request that another Office action be mailed rather than an Advisory Action in the event that the application is not in a condition for allowance in view of this Response.

Rejection under 35 U.S.C. 103(a)

The Examiner rejected claims 8-11 under 35 U.S.C. 103(a) as being unpatentable over Zhong et al. The Examiner also rejected claims 8-11 under 35 U.S.C. 103(a) as being unpatentable over Guo et al. (US 5,824,841). Specifically, the Examiner deemed that it would have been obvious to breed orange shell abalone exclusively since they are expensive and rare.

Applicants respectfully submit that the present invention is directed to the production of the orange color shell abalone, by selecting orange color shell abalone irrespective of the type of ordinary abalone breeders (including from China and Japan) and pair mating or mass mating between mature male and female abalone breeders with orange color shell. Selection of orange color shell abalone irrespective of the type of ordinary abalone breeders and pair mating or mass mating between mature male and female abalone breeders with orange color shell is considered

as an unforeseeable technique since the prevailing view in the prior art is that orange color shell is not a heritable characteristic.

The present invention is directed to producing orange color shell progeny of abalone based on the selection of parental breeders and artificial mating. Due to scarcity of the breeder with orange color shell and prejudiced view of being not being a heritable characteristic, there is no opportunity to mate between male and female abalone with orange color shell in the hatcheries or natural sea without an artificial operation. Although orange color shell abalone is accidentally observed in the hatcheries on rare occasions, such prior art hatchery methods do not teach or suggest obtaining orange color shell progeny by selecting breeders having orange shell color from a broodstock and mating them. Therefore, the Applicants respectfully submit that producing orange color shell progeny by selecting orange color shell breeders and artificial mating between male and female with orange color shell breeders of abalones is unobvious.

In particular, there have been no reports of abalone with an orange color shell before the artificial seed of abalone was propagated in the natural seas. The orange color shell abalone has been never reported before and observed in the natural sea according the literature, fishermen knowledge and investigation by the Applicants. In addition, orange color shell abalones are rarely observed in the hatchery. According investigation by Applicants, the orange color shell seed of abalones have been found in about 5-6 batches in a total more than about 3,000 batches of the commercial seeding activities in the past 2 decades. A total of 380 abalone seeds with orange color shell were recorded and, meanwhile, more than 4×10^9 seeds with wild type color (green) shell produced in China. Only about 5%-10% individuals with orange color shell could survive to adult stage even if optimum conditions were provided for the abalone. Because the orange color shell abalones that survived were cultured in the different hatcheries and different years, it was not observed or recognized that matings between two orange shell abalone resulted in orange shell progeny since two mature abalones having orange color shells hardly met to mate with each other. Therefore, without artificial controls, there was **no opportunity** to mate between a pair abalones with the orange color shell and no occurrence for orange the color shell abalones in natural conditions. Consequently, it is unobvious to mate a pair of abalones with orange shells in order to result in progeny with orange color shells with a reasonable likelihood

of success.

In fact, Applicants respectfully submit that there has been a long-felt need for the rare and expensive orange shell abalone which has been unmet until the present invention. Specifically, if it is obvious to mate a pair of abalones with orange shells in order to obtain progeny with orange color shells, why hasn't anyone done so before, especially in view of the fact that orange color shell abalone are rare and expensive. According to investigation by Applicants, no person (except the Applicants) has carried out experimental production of the orange color shell abalones by a pair mating in which the breeders with orange color shell. Furthermore, prior to the present invention, there was no commercial production activity of orange color shell abalone seeds by breeders with orange color shell.

Further, prior to the present invention, it was commonly believed that shell color of abalone is not a heritable characteristic. Thus, one skilled in the art would not be motivated to breed two abalone having orange color shells in order to obtain progeny having orange shells. Contrary to the prevailing belief in the prior art, Applicants discovered that orange color shell of abalone is a heritable and qualitative trait. Applicants submit that they are the first to confirm that property of orange color of shell in abalone is heritable and qualitative and the first to develop the technique to produce the orange color shell abalones.

In fact, Applicants discovered that all progenies with orange color shell can not be produced by parental mating, if the breeders are heterozygous in the loci regulating the shell color. Specifically, all orange color shell progenies are produced by mating only if the breeders with an orange color shell are homozygous in the locus regulating the shell color. For example, if orange color shell is regulated by two alleles in one locus, five genotypes will occur in a parental mating between orange color shell breeders. Of all the 5 genotypes, the first and fifth genotypes can produce all orange color shell progenies, because both parents are homozygous in the locus regulating shell color as shown in Table 1.

Table 1 shell color of parents, F₁ and F₂

Type	Genotype of parent female × male	Shell color		
		Parent	F ₁	F ₂

1	OO × OO	Orange	Orange	Orange
2	OO × Oo	Orange	Orange	Orange and wild type color (green or brown)
3	Oo × OO	Orange	Orange	Orange and wild type color (green or brown)
4	Oo × Oo	Orange	Orange (75%) Wild type color (25%)	Orange and wild type color (green or brown)
5	Oo × oo	Orange	Orange	Orange

If shell color is regulated by more than one locus, the progeny types are more complex. However, shell color of two genotypes is stably inherited when both parents are homozygous in the loci like first and fifth genotypes in Table 1. In fact, the third generation of orange color shell progenies has been grown out by Applicants. The three generations of progenies are uniform in the shell color, without any individuals exhibiting wild type color (green). Though there may be many loci regulating shell color, Applicants discovered that the orange shell color can be inherited.

In view of the prevailing prior art belief that orange shell color is not a heritable characteristic and the unmet long felt need for the rare and expensive orange shell abalone, the present invention is unobvious. Therefore, the rejection under 35 U.S.C. 103(a) should properly be withdrawn.

Request for Interview

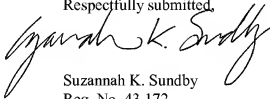
Applicants respectfully request either a telephonic or an in-person interview should there be any remaining issues.

CONCLUSION

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. However, in the event that additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. §1.136(a), and any fees required therefor are hereby authorized to be charged to **Deposit Account No. 02-4300**, Attorney Docket No. **034176R002**.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Suzannah K. Sundby', is written over the typed name.

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Dated: October 9, 2007